INTERFACE

User Manual

UM EN NEMA 4X SMS Enclosure

Order No.: 0126659

Pre-configured enclosure for SMS messaging

PHOENIX CONTACT
INSPIRING INNOVATIONS

INTERFACE

User Manual
UM EN NEMA 4X SMS Enclosure

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Designation: UM EN NEMA 4X SMS Enclosure

Revision: A

Order No.: 0126659

This user manual is valid for:

Designation	Order No.
RAD-SYS-NEMA4X-SMS	2917189

Please Observe the Following Notes

In order to ensure the safe use of the product described, you have to read and understand this manual. The following notes provide information on how to use this manual.

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DANGER
This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

The following types of messages provide information about possible property damage and general information concerning proper operation and ease-of-use.

NOTE
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1 Before Beginning

Thank you for your purchase of this Phoenix Contact RAD-SYS-NEMA4X-SMS. The enclosure provides reliable remote and backup power for Phoenix Contact's RAD-… wireless products.

This manual is a system-level guide for the packaged radio systems.

Radio model numbers and information about specific radios are not included in this manual unless there is an exception to installation or operation. For specific radio information, refer to the transceiver manual shipped with your unit.

1.1 Safety

Electricity, even at low voltages, can be dangerous. For your protection, Phoenix Contact recommends that installation, maintenance and repairs be performed by licensed or qualified personnel in strict accordance with applicable health, safety, building and electrical codes.

In order to guarantee the safe use of your device, we recommend that you read this manual carefully.

1.2 About this Manual

This manual contains the information necessary to understand, install, operate and order parts for the Phoenix Contact RAD-SYS-NEMA4X-SMS and associated components. The table of contents at the front of this manual provides a paragraph-by-paragraph breakdown of the subject matter covered in each section.

For your protection, Phoenix Contact recommends that installation, maintenance and repairs be performed by licensed or qualified personnel in strict accordance with applicable health, safety, building and electrical codes.

1.3 Product Description

The Phoenix Contact RAD-SYS-NEMA4X-SMS is a pre-assembled enclosure with an SMS relay antenna already installed. The enclosure assembly consists of a lockable NEMA 4X fiberglass enclosure containing a 24 V DC power supply, surge protection, antenna and pre-wired terminals. The only connections required are for primary power and interface connection to the customer-supplied equipment. All of the wire connections are made within the housing, with no connections exposed to weather.

The one-box design makes these systems well-suited for outdoor mounting and for use in areas with limited space.

2 Major System Components

This section provides technical information about the components that were supplied with the RAD-SYS-NEMA4X-SMS. Become familiar with the specifications for the items detailed in this section before making any connections.

2.1 NEMA 4X Fiberglass Enclosure

2.1.1 Description

The fiberglass-reinforced polyester material utilized in the enclosure exhibits high impact resistance, a superior range of temperature limits, excellent dimensional stability, excellent electrical properties, and excellent moisture and overall chemical resistance. For information about specific corrosive agents, refer to Section A, “Technical Appendix”. The enclosure is suitable for indoor or outdoor installation, requires little maintenance, is light-weight, and is easily handled and modified. Two lockable twist latches provide security for installed components.

2.1.2 Dimensions

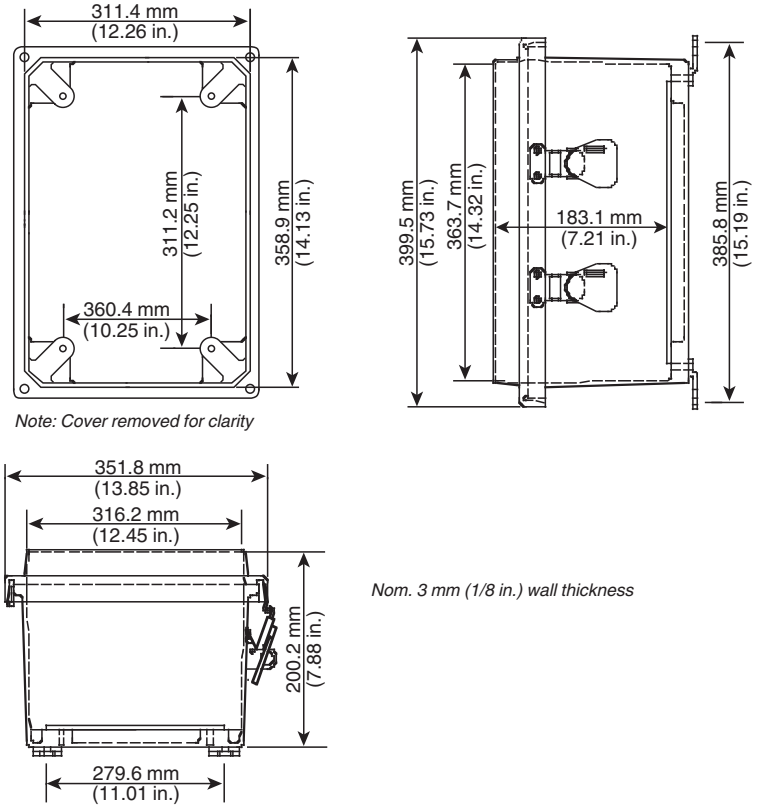
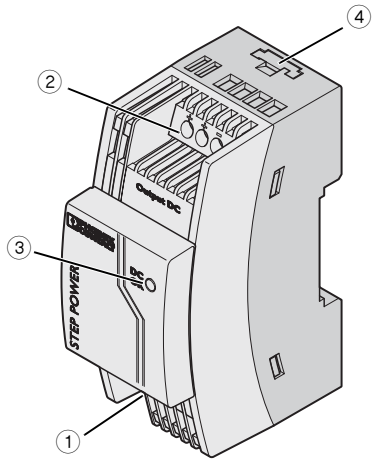


Figure 2-1 Enclosure dimensions

2.2 STEP-PS/1AC/24DC/0.75 Switched Power Supply

2.2.1 Description

The STEP-PS/1AC/24DC/0.75 power supply provides 24 V DC power in a small, low-profile housing.



1 AC input
2 DC output
3 "DC OK" LED
4 DIN rail release latch

Figure 2-2 STEP-PS/1AC/24DC/0.75

2.3 MAINS-PLUGTRAB AC Power Surge Protection

The MAINS-PLUGTRAB provides overvoltage protection from electrical transients caused by lightning, switching operations, utility actions, and de-energized inductive loads. It provides protection to power supplies, PLCs, PCs, controllers and other electrical equipment.

The MAINS-PLUGTRAB consists of two pieces: a hard-wired base and a removable plug. The base accepts wire sizes from 24 to 12 AWG. The metal mounting foot allows secure connection to the mounting rail and provides a short path to ground for surge current, increasing the performance and protection for the equipment. The base is a feed-through terminal block. Power is not interrupted to the equipment regardless of plug status (or presence).

Two-stage design provides both normal mode and common mode protection with metal oxide varistors (MOVs) and a gas tube. The plug contains a thermal disconnect that monitors the status of the MOV. When the MOV is removed from the circuit, a red lamp indicator illuminates to provide local indication that the plug should be replaced. A normally closed contact opens at the same time and can be used for remote indication of plug status.

2.3.1 Remote Contact

The "dry" normally-closed (NC) alarm contact can be connected to a remote warning device. Do not exceed the maximum current and voltage rating of the contact: 1 A and 250 V AC. Terminals 11 and 12 are for the NC contacts.

2.3.2 Red Indication Lamp and Plug Replacement

When the red lamp illuminates, it indicates that the protection plug should be replaced as soon as possible. Operating current will continue to be supplied to the protected equipment even when the lamp is lit, although no surge protection is being provided.

To replace the plug, pull it straight out from the base. Confirm that the replacement plug is of the proper voltage and push the new plug into the base. If the plug does not fit into the base, double check the orientation. The correct replacement plug is PT 2-PE/S-230AC-ST (Order No. 2839347).

2.4 PSI-GSM/UTMS-QB-ANT Antenna

The Phoenix Contact antenna is a low-profile design for UMTS and GSM networks operating in the 850, 900, 1800, 1900 and 2100 MHz frequencies.

3 Installation

This section provides the information necessary to install the RAD-SYS-NEMA4X-SMS. Before installing the system, become familiar with the components and their functions as outlined in Section 2, “Major System Components”.

A short time spent planning the installation can help prevent performance problems later on. Select a location that provides a stable mounting surface and also allows for convenient routing of the antenna, power and data cabling. All of these cables (but especially the antenna feedline) need to be kept as short as possible to minimize losses. Refer to the transceiver manual for a feedline loss chart. Packaged systems are normally mounted in either a wall-mount or pole-mount configuration. If possible, install the unit in a location that can be easily reached while standing on the ground. This allows convenient access for test and servicing of the radio system.

If the unit must be installed in a location that is not easily accessible, it may be desirable to first operate the packaged system on a test bench to verify proper operation with customer-supplied equipment and to set any programmable parameters before installation.

NOTE:
The use of stainless steel mounting hardware is recommended for outdoor installations.

Before attempting to install and wire the enclosure, please read all instructions carefully. Phoenix Contact recommends placing this manual in the enclosure for future reference.

WARNING:
Always disconnect power and remove fuses from the main fuse terminal block before working on this equipment.

3.1 Tools and Equipment

Tools are not supplied with the Wireless RTU Enclosure. However, the following tools are recommended to ensure a successful installation.

Slotted-head screwdriver	Phillips-head screwdriver
Wire cutters	Stripping tool
Crimping tool	Multimeter
Open-end wrench set (standard)	Socket set (standard)
Pliers	Hacksaw
Utility knife	Hex-head wrench set

3.2 Additional Material Considerations

The following is a list of additional materials that might be needed to complete the installation.

- Conduit
- Earth-ground rod, ground cable and clamps (per local codes)
- Mounting pole; up to 38.1 cm (15 in.) diameter. Suitable for mounting antenna and enclosure
- Wire for connecting external sensors, switchgear, etc.
- Pole-mounting kit (Order No. 2900038) for pole-mounted installations, or lag screws for wall-mounted installations
- Wire wraps
- Padlock
- Accessories (if necessary)

3.3 Mounting the Enclosure

There are two mounting arrangements available for the RAD-SYS-NEMA4X-SMS: pole mounted or wall mounted.

NOTE:
Mount the RAD-SYS-NEMA4X-SMS out of direct sunlight. In direct sunlight heat buildup may cause damage to the electronic devices inside.

Methods for mounting the unit in both of these configurations follow. When planning the installation, refer to Figure 2-1, which shows the mounting dimensions of the RAD-SYS-NEMA4X-SMS packaged system.

3.3.1 Wall Mounting Instructions

The steps below describe mounting of the RAD-SYS-NEMA4X-SMS to a wall or other flat surface. Suitable fasteners that can support the weight of the unit must be obtained locally.

To mount the unit on a wall, follow these instructions:

1. Attach the four keyhole mounting clips, 1, to the back of the enclosure, 2, with the included #10-32 screws, 3, as shown in Figure 3-1.

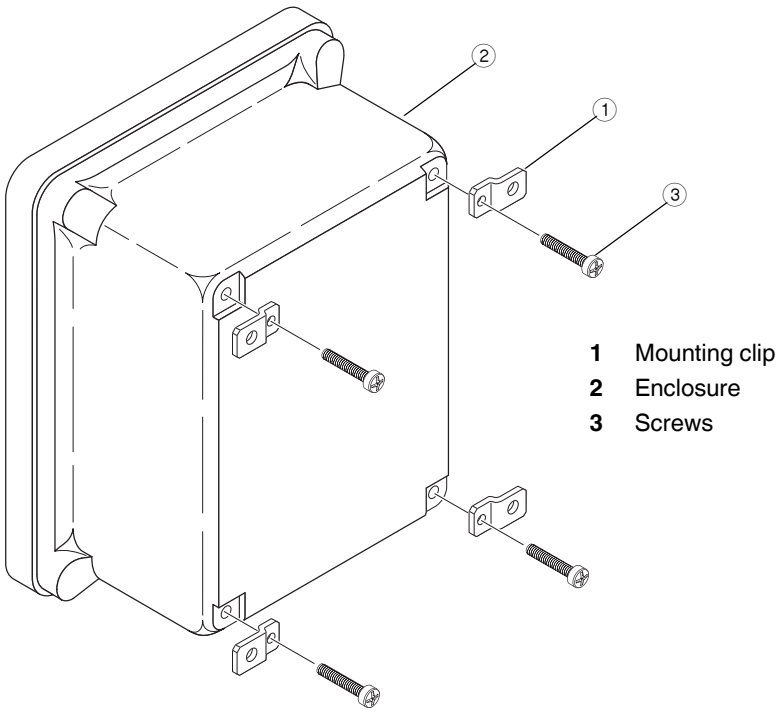


Figure 3-1 Typical wall-mount installation.

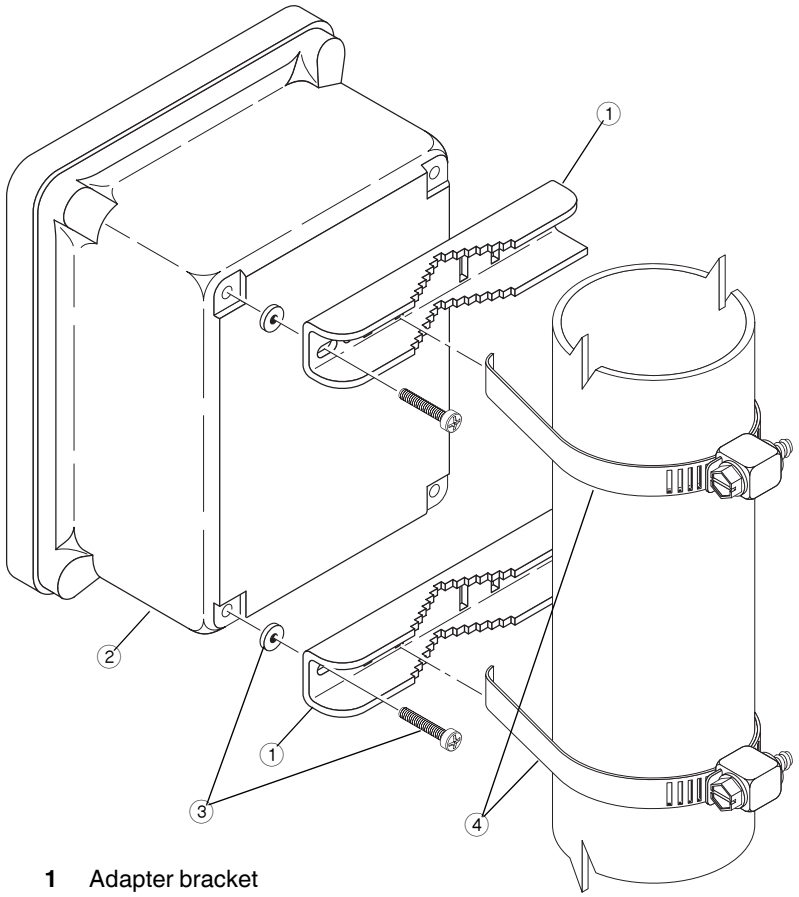
2. Hold the enclosure up to the wall in the desired mounting position. Have an assistant mark the location of the four mounting holes with a pencil or marker. Place the marks in the center of the wide portion of the mounting clips.
3. Prepare the mounting surface for the fasteners to be used. (If using lag screws, a small pilot hole at each mark will allow easier starting of the screw.)
4. Insert the screws partway into the wall, leaving enough space to slide the enclosure mounting clips onto the screws. Hang the packaged system enclosure onto the four screws and tighten the screws securely. Do not over-tighten.

3.3.2 Pole Mounting Instructions

Standard pole mounting requires the use of a pole-mount adapter kit (Order No. 2900038). The kit can be used to mount the enclosure on round, square or rectangular pole shapes. These brackets must first be bolted to the enclosure. The complete assembly can then be mounted to a pole with a diameter up to 38.1 cm (15 in.).

To pole mount the unit, follow these instructions:

1. Attach the two pole-mount adapter brackets, 1, to the enclosure, 2, with the included #10-32 screws and washers, 3, as shown in Figure 3-2.



1 Adapter bracket
2 Enclosure
3 Mounting hardware
4 Adjustable bands

Figure 3-2 Typical pole-mount installation

2. Slip the adjustable bands, 4, through the slots on the brackets. Choose slots that correspond to the size of the pole that the enclosure will be mounted on.
3. With the help of an assistant, position the enclosure on the pole at the desired mounting height.
4. Tighten the bands securely, but do not over-tighten.

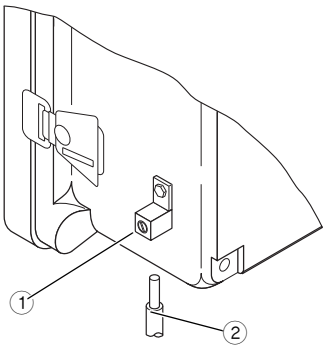
3.4 Connecting the Conduit

The RAD-SYS-NEMA4X-SMS features several pre-drilled holes in the bottom surface. They are sealed with NEMA 4X-rated plugs. To utilize the pre-drilled holes, perform the following steps.

1. Remove the plugs using a 3/8 in. hex-head wrench and pliers or a wrench, then install 1/2-in. conduit fittings. The holes can be resized for larger diameter conduit, if needed. To maintain the NEMA 4X rating, the fittings must be properly sealed.
2. Ensure that the end of the conduit is cut straight and is not bent.
3. Insert the end of the conduit into the connector body and tighten the compression nut. Cable glands may also be used, provided they are suitable for the environment they will be installed in.

3.5 System Grounding

The RAD-SYS-NEMA4X-SMS must be connected to earth ground. This system should be grounded per the 2002 National Electric Code. Refer to Articles 690 and 250 of the NEC. A 13.30 mm^2 (6 AWG) grounding cable (not supplied) is recommended for making the earth-ground connection.



1 Ground-earth lug
2 Ground-earth cable

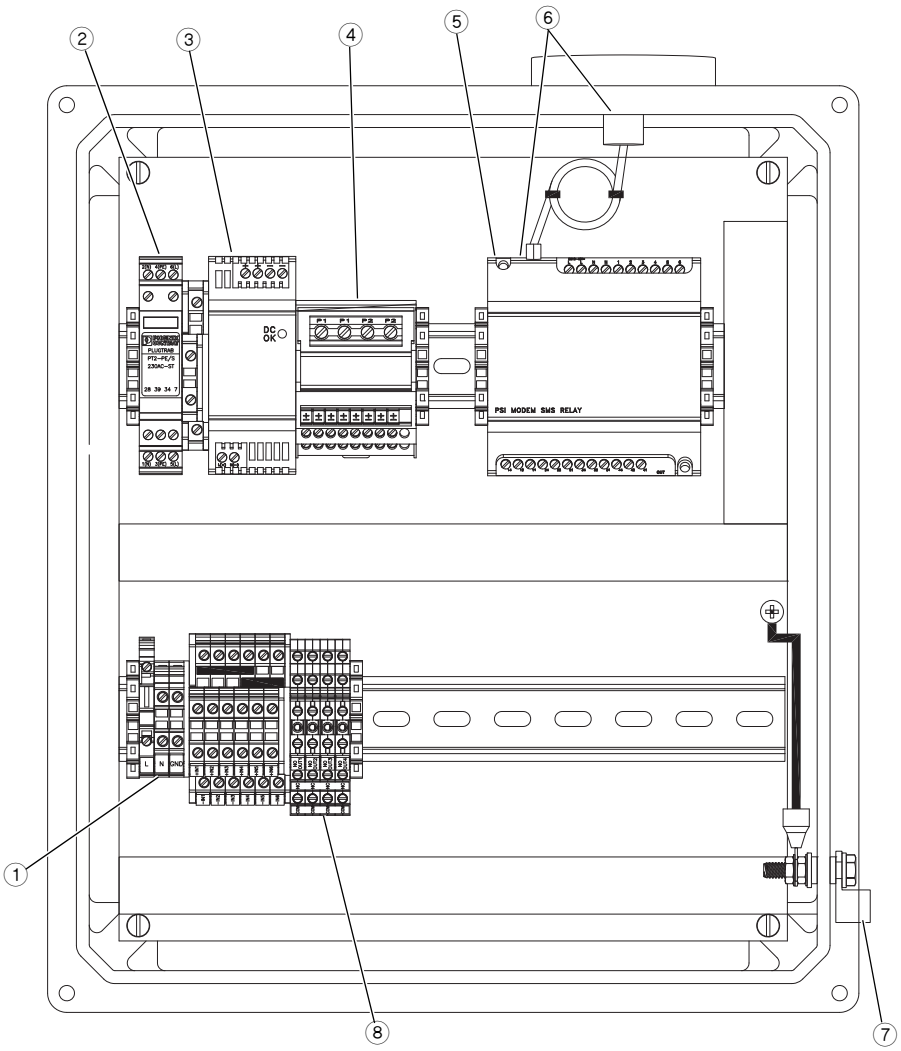
Figure 3-3 Ground-earth lug

A ground-earth lug, 1, is provided on the side of the enclosure. The back panel of the enclosure and the antenna surge arrestor are connected to this lug. After inserting the ground-earth cable, 2, into the lug, torque the lug screw to 6 N·m (50 lb_f-in.).

3.6 Wiring the Enclosure

3.6.1 Main Power

The main power input terminations for the RAD-SYS-NEMA4X-SMS are provided as three, labeled terminal blocks on the left side of the upper mounting rail. Primary power wiring must be routed via conduit to the hole on the bottom left of the enclosure. This hole is pre-drilled for a 1/2-in. conduit fitting. Once inside the enclosure, the wiring can be guided to the top rail via the wiring duct.



1	Line power	**5**	SMS modem relay
2	MAINS-TRABTECH	**6**	Antenna connection
3	Power supply/UPS	**7**	Ground-earth lug
4	VIP power distribution	**8**	Terminal block connectors

Figure 3-4 Enclosure connections

The terminal blocks accept a wire size from 26-10 AWG (solid 0.14-6 mm^2, stranded 0.14-4 mm^2). Cut the wires to the appropriate length, strip the wire sheath to expose 9 mm (0.35 in.) of the conductor, and insert them into their corresponding terminal block.

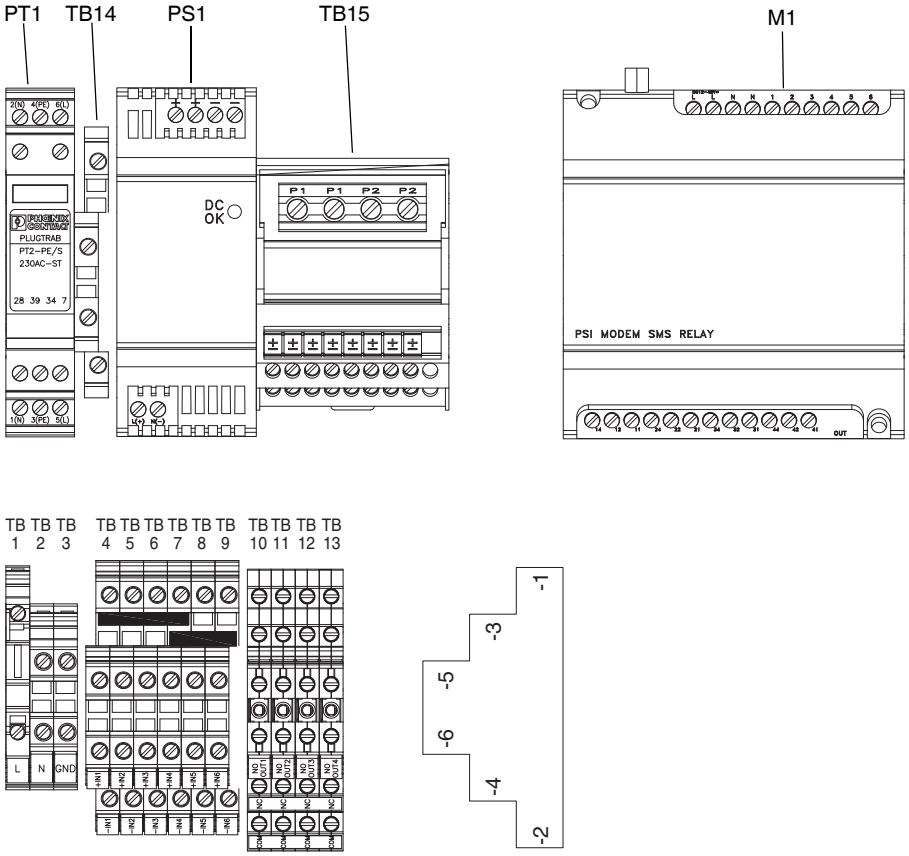
For information on input voltage ranges, refer to Section 6.2.

3.6.2 Ancillary Devices

Signal wires can be fed into the enclosure through one of the pre-drilled holes. Field-wireable connectors can be used to bring serial or Ethernet data cables into the enclosure. Devices that are powered using 24 V DC can be powered by the system provided they do not exceed the current sourcing capabilities of the STEP-PS/1AC/24DC/0.75. Connections are made on the power distribution module.

3.6.3 Rewiring

In the event a wire must be reconnected, use the following to ensure proper connection.



From	To	Wire size (AWG)	Color	From	To	Wire size (AWG)	Color
TB1-1	PT1-5	14	black	TB9-3	M1-6	18	blue
TB2-2	PT1-1	14	white	TB9-1	M1-N	14	black
PT1-6	TB14-1	14	black	TB10-1	M1-11	18	blue
PT1-2	TB14-3	14	white	TB11-1	M1-21	18	blue
TB14-2	PS1-L(+)	14	black	TB12-1	M1-31	18	blue
TB14-4	PS1-N(–)	14	white	TB13-1	M1-41	18	blue
PS1-+	TB15-P1	14	red	TB10-3	M1-12	18	blue
PS1-–	TB15-P2	14	black	TB11-3	M1-22	18	blue
PS1-+	M1-L	14	red	TB12-3	M1-32	18	blue
PS1-–	M1-N	14	black	TB13-3	M1-42	18	blue
TB4-3	M1-1	18	blue	TB10-5	M1-14	18	blue
TB5-3	M1-2	18	blue	TB11-5	M1-24	18	blue
TB6-3	M1-3	18	blue	TB12-5	M1-34	18	blue
TB7-3	M1-4	18	blue	TB13-5	M1-44	18	blue
TB8-3	M1-5	18	blue				

Figure 3-5 Component connections

3.7 Final Checkout

Before installing fuses and energizing the system, inspect the installation.

1. Confirm the correct polarity on all power and signal connections.
2. Ensure there are no short-circuited connections.
3. Inspect conduit connections for proper seals and secure all external cabling in conformance with applicable electrical codes.
4. Verify the enclosure is securely mounted and will not be moved or damaged by high winds.

Once the installation is completed, prepare to energize the system by installing the main power fuse.

4 Maintenance

4.1 Start-up Procedures

As soon as primary power is applied to the packaged system, the unit is ready for operation. Follow these steps to begin operation:

1. Apply primary power to the packaged system.
2. Observe the LEDs to check for normal operation. Verify that the “DC OK” LED is illuminated on the STEP-PS/1AC/24DC/0.75 to indicate proper operation. Check radios and other installed devices for operating status.

4.2 Preventative Maintenance

The RAD-SYS-NEMA4X-SMS systems are designed for long life and trouble-free operation. However, because these units are typically installed in harsh outdoor environments, periodic inspection of the equipment is recommended.

The system should be checked occasionally for loose or corroded hardware, loose cable connections and damage to the exterior housing. The door seals and cable entrances should be checked for signs of leakage or other damage. When performing preventive maintenance, it is also a good idea to check related equipment, such as the antenna system, for signs of damage or loose connections.

5 Ordering Information

5.1 Ordering Data

Products

Description	Type	Order No.	Pcs./Pkt.
NEMA 4X radio enclosure for SMS relay	RAD-SYS-NEMA4X-SMS	2917189	1

Accessories

Description	Type	Order No.	Pcs./Pkt.
Pole-mounting kit, for enclosure	RAD-SYS-BKT	2900038	1

6 Technical Specifications

6.1 Enclosure

The enclosure utilized for the RAD-SYS-NEMA4X-SMS system is listed under the UL 508 standard (CSA standard 22.2 No. 14-M91). It is suitable for both indoor and outdoor use in corrosive environments and is resistant to UV degradation. The fiberglass material meets UL 746C requirements with halogen-free and self-extinguishing characteristics.

– Any external metal parts shall be 304 stainless steel. Any internal metal parts shall be manufactured using corrosion-resistant materials.

6.1.1 Chemical Resistance

In most applications, fiberglass-reinforced polyester offers the best all-around performance in corrosive environments. Appendix A rates the resistance of the enclosure against many common reagents found in industrial and commercial environments.

Chemical Resistance Ratings

A = EXCELLENT

B = LIMITED

C = POOR

The environmental resistance ratings are based upon tests where the specimens were placed in complete submergence in the reagent listed. If there are any questions about specific suitability in a given environment, prototype samples should be tested under actual conditions.

The prospective user must determine the application of the product in an environment based upon individual characteristics. Phoenix Contact offers no guarantee or warranty as to the applicability of this chart for any particular situation as actual conditions of use are beyond our control. In many applications, several corrosive agents are present and reactions among them are not always documented. Any environment can be rather unique, necessitating the identification of all possible corrosive elements that may affect the intended enclosure application.

6.2 STEP-PS/1AC/24DC/0.75

Input data	
Input nominal voltage range	100-240 V AC
AC input voltage range	85-264 V AC
DC input voltage range	95 V DC ... 250 V DC
AC frequency range	45 Hz ... 65 Hz
DC frequency range	0 Hz
Input fuse, integrated	1.25 A (slow-blow, internal)
Type of connection	Screw connection
Stripping length	6.5 mm

Output data	
Nominal output voltage	24 V DC ±1%
Output current	0.75 A (-25°C ... 55°C) 0.83 A (-25 °C ... 40 °C permanent) 1.4 A (maximum output current)
Type of connection	Screw connection
Stripping length	6.5 mm

A Technical Appendix

A 1 Chemical Resistance

Tables A-1 through A-6 rate the resistance of fiberglass-reinforced polyester against various chemical compounds. The ratings available are

A = EXCELLENT

B = LIMITED

C = POOR

CAUTION:
If multiple compounds are present in an industrial environment, they may react to one another, forming different compounds. The enclosure may not be as resistant to these compounds.

Table A-1 Resistance to Salts

Reagent	Resistance Rating
Ammonium sulfate	A
Potassium ammonia sulfate	A
Ammonium bichromate 20%	B
Ammonium carbonate 10%	B
Ammonium chloride	A
Ammonium nitrate	B
Ammonium sulfate 10%	A
Ammonium acetate	C
Aniline sulfate	A
Carbonate of barium	C
Chloride of barium	A
Calcium chloride, saturated sol.	A
Calcium hypochlorite	B
Calcium sulfate	A
Copper (II) chloride	A
Copper (III) sulfate	A
Iron (III) chloride	A
Iron (III) nitrate	A
Iron (III) sulfate	A
Iron (II) chloride	A
Iron (II) sulfate	A
Magnesium chloride	A
Magnesium sulfate	A

Table A-1 Resistance to Salts (continued)

Reagent	Resistance Rating
Mercuric (ll) chloride	A
Nickel chloride	A
Nickel nitrate	A
Nickel sulfate	A
Potassium carbonate	B
Potassium chloride	A
Potassium nitrate	A
Potassium sulfate	A
Nitrate of silver	A
Sodium acetate	A
Sodium bicarbonate 10%	A
Sodium carbonate 10%	B
Sodium chloride	A
Sodium hypochlorite 5%	B
Sodium nitrate	A
Zinc chloride	A
Sulfate of zinc	A

Table A-2 Resistance to Acids

Reagent	Resistance Rating
Acetic acid	A
Benzoic acid	A
Boric acid	A
Chromic acid 30%	C
Citric acid	A
Formic acid 25%	B
Hydrochloric acid 10%	A
Conc. hydrochloric acid	B
Lactic acid 1%	A
Nitric acid 5%	B
Nitric acid 50%	C
Concentrated nitric acid	C
Phosphoric acid 25%	B
Phosphoric acid 50%	C
Sulfuric acid 25%	A

Table A-2 Resistance to Acids (continued)

Reagent	Resistance Rating
Sulfuric acid 50%	C
Tartaric acid	A
Oxalic acid, saturated solution	A

Table A-3 Resistance to Bases

Reagent	Resistance Rating
Ammonia 5%	B
Ammonia 25%	B
Barium hydroxide 10%	C
Calcium hydroxide	C
Hydroxide of sodium 5%	B
Hydroxide of sodium 20%	C

Table A-4 Resistance to oils and greases

Reagent	Resistance Rating
Fatty acids	A
Oleic acid	A
Stearic acid	A
Lubricating oil	A

Table A-5 Resistance to organic solvents

Reagent	Resistance Rating
Acetone	C
Amyl alcohol	B
Methanol	B
Ethyl alcohol	B
Benzene	B
Butyl acetate	C
Carbon bisulfide	C
Gasoline	A
Petroleum	A
Naphtha	A
Perchloroethylene	B
Toluol	B

Table A-5 Resistance to organic solvents (continued)

Reagent	Resistance Rating
Ethyl acetate	B
Dichlorethylene	B
Ether	B

Table A-6 Resistance to other agents

Reagent	Resistance Rating
Ethylene glycol solution of 0 to 100%	A
Glycerine	A
Chlordioxide (bleaching agent)	C
Saturated chlorinated water	A
Formaldehyde 10 to 40%	A
Hydrogen peroxide 5 to 10%	A
Normal water	A
Distilled water	A
Sea water	A
Phenol	B